# THE NATURE CONSERVANCY NEWS

January/February 1980

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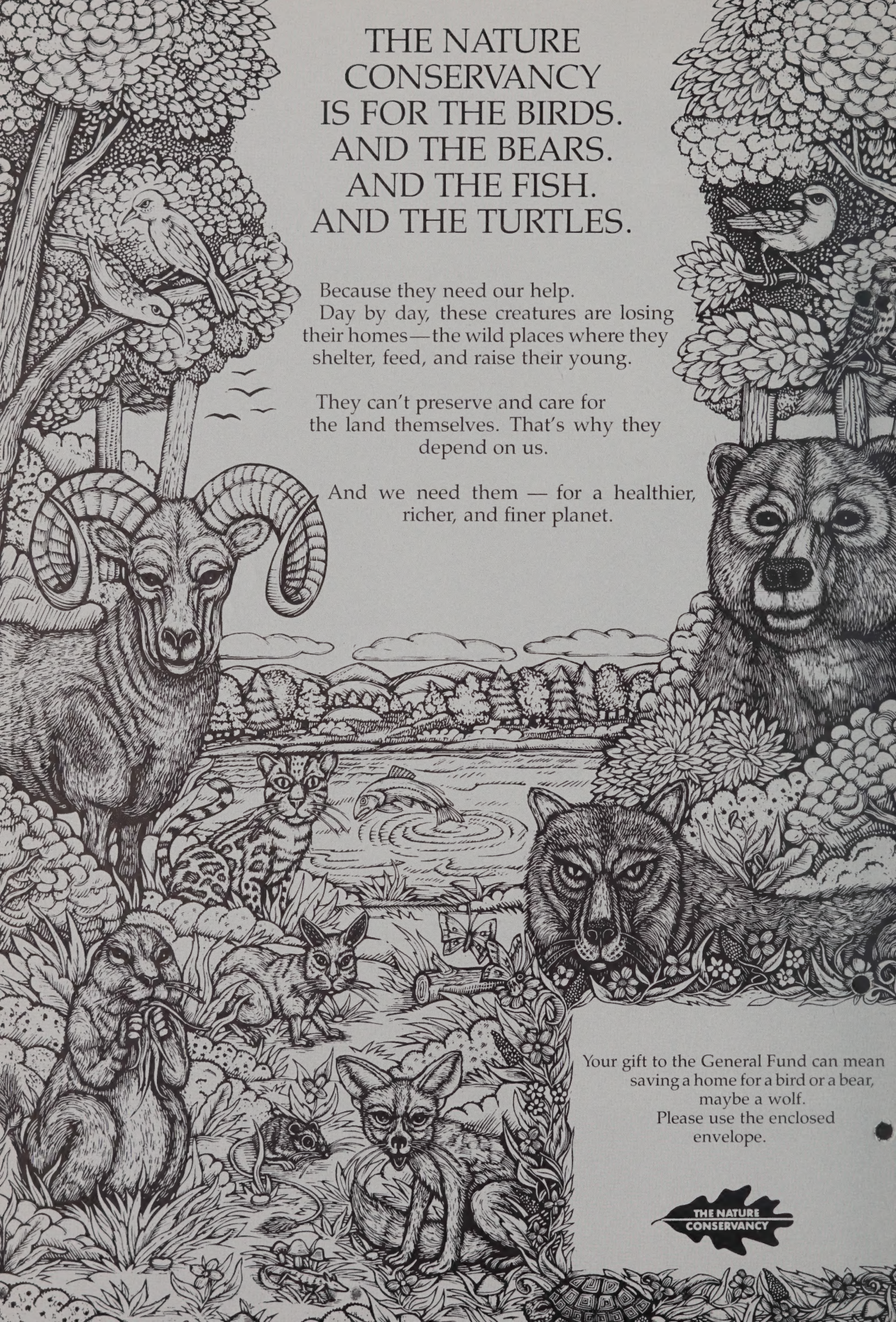
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THE NATURE CONSERVANCY

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**COVER:** Once predominant in the great bottomland forests, the southern black bear has retreated to the region's remnant wildlands. Photo by Ken Taylor.

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The Nature Conservancy

The Nature Conservancy is a national conservation organization committed to the preservation of natural diversity by protecting lands containing the best examples of all components of our natural world.

To date the Conservancy and its members have been responsible for the preservation of 1,586,706 acres of forests, marshes, prairies, mountains, and islands: home to rare and endangered species of wildlife and plants. 2,234 projects have been completed since the acquisition of the first preserve in 1954. Approximately 60% of all preserves are retained by the Conservancy and managed by volunteer land stewards.

A membership, non-profit organization, the Conservancy was incorporated in 1951 in the District of Columbia for scientific and educational purposes.

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# The Bottomlands of the Gulf Coast

by Donald G. Schueler

Atchafalaya, Bogue Chitto, Pascagoula, Choctawhatchicola . . . the names, sonorous and more-or-less Indian sounding, are easier on the ear than the eye. Either way, apart from sounding vaguely geographic, they are not likely to ring bells of recognition in the minds of most Americans. However, if the muster is extended a bit to include the Tombigbee, the Mobile, the Suwannee, we get the idea: these are all southern rivers, and a glance at a map will indicate that—from Texas to northern Florida—they bracket the Mississippi River, debouching, like their stupendous sister, into the Gulf of Mexico amid a welter of marshes and shallow waters which their own waters greatly enrich.

They are rivers, but not just rivers. Each name attaches not only to a waterway but to the distinctive ecological world which that waterway creates. To some extent, this is true of all rivers anywhere. But in most of the United States the declivity and composition of the earth's surface decrees that a river must cut a relatively narrow passage for itself through belted rock, so that its direct influence on the surrounding terrain is intensely but narrowly felt. Not so the rivers of the central South as they enter the Gulf Plain. Here the tilt of the land is moderate to imperceptible, and the soils so unresisting that even easy-going currents shove them back and forth. Between earth and water there is a perpetual jostling for place, in which first one element, then the other, has the upper hand. The effects of this competition are apparent in both the short and long term. Depending on the season and annual rainfall, the Atchafalaya, the Bogue Chitto, and the others, climb out of their banks or recede within them, swamping the surrounding lowlands or leaving them relatively high and dry. Over the course of a few or many years, the burden of silt carried by these rivers in their high stages is left behind in their retreat, elevating the profile of the resurfacing land. Meanwhile the rivers themselves, recurrently hemmed in by their own alluvium, change course from time to time—usually content to lop off a bend here or there, but once in a great while discovering an entirely new route to the sea.

Depending on the power of the waterway and the lay of the land, the accompanying lowlands may vary in width from a hundred yards, in the case of watershed creeks, to a hundred miles, in the case of the Mississippi River and its tributaries. These alluvial plains, in which it is not always easy to say just where land leaves off and water begins, are the physiographic homeland of the southern bottomland hardwood forest, the most ecologically valuable—but ironically the least prized—of all the nation's forest systems. (Actually, from a biologist's point of view, these woodlands are not one system but many, encompassing all sorts of subtle shifts in biotic community depending on slight variations in elevation, frequency of flooding, and geographic location. But in general appearance they are as like each other as they are unlike any other natural setting.)

There is no such thing as an ugly natural landscape, although some are more unfriendly or monotonous-looking than others. Beyond that, beauty—as the cliché proves—is in the eye of the beholder. But to the extent that aesthetics involves more than spectacular effects or pretty views (that is, to the extent that it incorporates complexity, depth, suggestiveness), the appearance of the bottomland hardwood forest is arguably as lovely as anything in nature. Trouble is, it does not lend itself to easy viewing. The would-be admirer cannot see it from a traversing road or bridge, or even from the middle of the river on which its life depends. On all such thoroughfares it turns its back. A bottomland must be entered, which is more easily said than done. If the particular forest has any age to it and if it is late summer or autumn in a low water year, it may be possible to take a stroll, if not a real hike, along some convenient bluff or ridge. But for the novice it is easy to get turned around. And in any case, even in the driest season, the path is likely to be barred, more often sooner than later, by water—a slough perhaps, shining darkly among the trees, or the ill-defined edge of a serious cypress swamp. Moreover—and not just for the novice—there is the warm-weather thought of snakes. A bottomland forest looks like the sort of place that snakes appreciate, and it is. This is only fitting, in keeping with the habitat's terrific ecological productivity; but in the specific case, some people are a bit daunted. Almost all the available snake species are harmless, but it is likely that the cottonmouth (or moccasin) is on the premises; it can be disconcertingly abundant even in mere fragments of damp places. Although it hardly ever bites people, and almost never kills them when it does, its thick, blue-black presence is hard to see. At water edges, even the most attuned swampers step onto fallen logs instead of over them.

All things considered, a boat is the best means of travel; and spring, when the water is high and the forest bright and cool, the best time to visit. How deep-in one gets and how much one sees will depend in inverse proportion on the size of the available skiff and its outboard motor. Outboard motors will go just about anywhere, up to a point, and almost every habitual traveler in the bottomlands uses them at times. But their noisy intrusiveness is an abomination all the same, like cursing in church or storming the winter woods with a snowmobile. If there is enough time, the best way to get about is in a canoe or shallow bottomed pirogue (dugout), propelled by paddle or pole.

Once entered, the bottomland forest is perceived as a series of drifting images, at first general and impressionistic, then more and more precise. The unmoored sense of things, of water and forest interpenetrating each other's normally separate domains, has a disembodying effect that no other landscape this side of a rain forest—or a dream—is likely to inspire. Inevitably there is an unoriginal but powerful inclination to think in terms of "gothic" shadowiness, "gloomy" silence, and the otherness of natural forms. At one moment the slough-creek-bayou may be screened by feathery crowds of black willow—an ambitious, whispering tree that takes hold of a newly formed sandbar in a mere season or two, trying to anchor it before the river can move it somewhere else like a piece of furniture. A little further on, an "oxbow" lake—a cut-off bend left behind by the changing channel—opens up. Its still black water mirrors a stand of water tupelo and cypress trees, fat-buttocked, narrow-shouldered—the former leaning out towards the light, the latter standing narrow and erect. On one side, beyond the wall of trees, is a narrow savannah—a drowned meadow glittering with pitcher plants and more than its share of uninterrupted sunlight. On the other, the tupelo and cypress may extend back into an indefinite "bay" choked with musty logs, tannic pools, and the huge stumps and knees of the original forest.

Presently, the scene shifts again. The trees are crowding in; the water becomes increasingly shallow; the way is clogged with snags. Just ahead is an "island," which in this mostly concave terrain means any modest rise that is relatively dry and, in drier seasons, will take the shape of a distinctive ridge. Here, on this island—in the wake of some long ago fire—a "barren" of tall, pencil-straight slash pines has imposed a startling geometry on the blurred deciduous woodland that surrounds it. Even so, among the yucca and palmetto on the island floor, the seedlings of a hardwood forest

*Tree islands: a stand of sturdy cypress and water tupelo.*

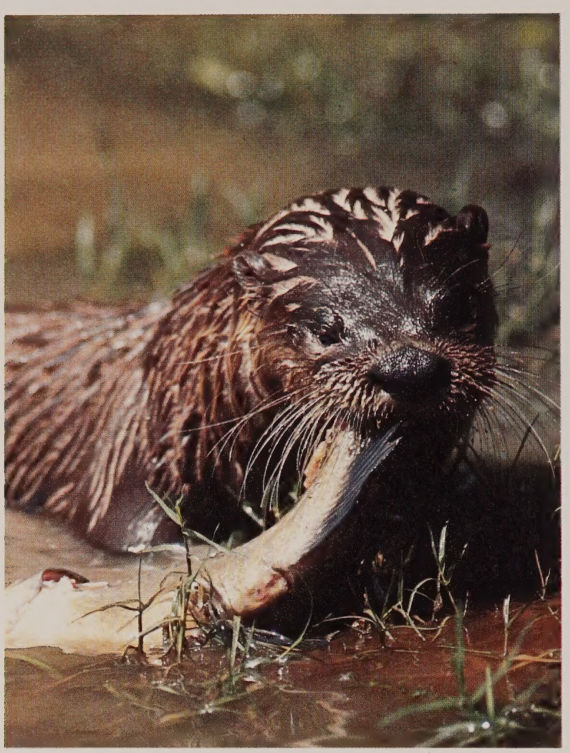
are already springing up. Unless fire comes again in a year of exceptional drought, this new succession of trees will eventually displace the pines and reclaim the island for itself.

Islanded ridges and damp savannahs, willow banks and cypress bays—all are part of the alluvial forest ecosystem. But the most characteristic embodiment of that system is the mixed woodland, which until recently mantled the intermediary zones between the almost-always-dry and the almost-always-wet. It is a complex tree society, composed of sweet bay, cottonwood, sweet gum, swamp maple, water birch, titi, and water hickory intermixing—wherever the drainage allows—with yellow poplar, holly, wild pecan, sycamore, water oak, and a host of other species. This is a forest that looks old before its time; even adolescent trees are druidically distinctive, their roots exposed and sprouting ferns, their trunks and limbs fretted with lichens, moss, assorted fungi, and climbing vines of catbriar thick as medium-sized anacondas. The pervasive hues are black, gray, and all possible greens. The air is pale green and smells of mulch.

So much for general impressions. The details are literally beyond anyone's absorption, but a sample may suggest: there might be, for instance, the abrupt taking-off from some backwater slough of several wood ducks, or a Louisiana or great blue heron, or an egret, or bitterns, or a gallinule; the spidery whiteness of spider lilies; a scary rush of a hand-sized fishing spider hunting, among other things, small fish; the plop and whirl of agitated water as a three-foot alligator or a terrapin makes a getaway; the indifference of a basking water snake; the crucified pose of the "snake bird," the anhinga, drying out its wings; the odd palmetto growing ten feet overhead from the broken limb of a sweet bay tree; a barred owl, at the same elevation, refusing to budge; a mud bank tattooed with the myriad tracks of raccoons, wading birds, mink, nutria, muskrat—or, less likely, of an otter, a wildcat, a deer, a wild pig; the shining of a prothonotary warbler in the smokey shadows; the sudden beauty, beyond the reach of any description, of the rare swallow-tailed kite suspended like an ornament, icy white and black, above the cypress trees.

Until about 25 years ago, these broodingly lovely forests seemed immune to permanent change. They were too vast—many millions of acres blanketing the coastal South—and supposedly too wet and too difficult to clear, to ever be anything but what they were. That assumption, along with most of the forests, is now gone.

It is still difficult to believe that the wholesale destruction of this ecosystem was allowed—still is being allowed—to happen. True, the worst of it has occurred in a single generation, a mere blink of Time's eye. Until recently, it was not widely understood that the ecological life of the bottom-



*Above: a river otter, sleek with Gulf waters, dangles his catfish catch; top right: a rhapsodic Suwannee River, blue woodland, moss, and mist; right: spider lilies stun a southern riverbank.*

lands was more complex and productive, its fauna and flora more various and more threatened, its destruction less necessary or inevitable than in the case of many other wild areas that have been the scene of better publicized environmental battles. It is also true that during the critical years, the South was widely regarded as a controversial and unenlightened region. Its citizens contributed little to the memberships of national environmental organizations, and the organizations themselves were headquartered elsewhere. With the exception of The Nature Conservancy and one or two other groups, environmental organizations have been slow to man the barricades in the struggle to save the rich bottomlands, with the bitter result that most of them are already lost.

In this grim chapter of conservation history, there is no question that the U.S. Corps of Engineers plays the role of heavy. In the Corps, the engineering, bureaucratic, and political mentalities are forbiddingly conjoined—with the result that imagination, far-sightedness, or environmental enlightenment are not among the agency's visible characteristics. But the Corps of Engineers is very influential. Originally conceived as an agency to control floods threatening human life and property, it is now the willing instrument of any politicians, oil or barge companies, chambers of commerce, or agri-business corporations that want a river dredged, a stream leveed, a swamp or bottomland drained—all at taxpayer expense.

The consequences of the Corps' bulldozing activities are almost beyond anyone's comprehension: in the lower alluvial plain of the Mississippi River, for example, only 3 million of an original 25 million acres of bottomland forest—less than one-eighth of the acreage—survive. Twenty years ago, anyone flying from Baton Rouge to northern Arkansas on either side of the river would have passed over an immense jungly looking canopy reaching to the horizon. The same flight today will reveal an almost unbroken flat plain of soy-

*Left: a sleek swamp-dweller, the brown water snake; lower left: spare and elegant, the courtly figure of a snowy egret; below: bold coral blossoms give the trumpet vine its name.*

bean fields, the result of billions of dollars' worth of dredge and drain projects. It should be noted that this epic conversion has been achieved, in many instances, by means of cost/benefit computations that would make any reputable accountant in the private sector gasp in disbelief. Moreover, the projects are not very "job-productive," and the benefits accrue to relatively small numbers of large land-owners or corporations whose land, in many cases, it would have been cheaper for the Corps to lease than to drain.

Elsewhere in the South, major rivers and streams have been dredged to accommodate barge traffic at the expense of already existing railroad systems. In some small watersheds, bottomland forests are ironically drowned rather than drained, either by reservoirs for towns that do not really need them, or recreational lakes that submerge more recreational opportunities than they provide. In fairness, the Corps is not responsible for all the ills the bottomlands are heir to. Its bureaucratic ally, the U.S. Soil Conservation Service, has gutted thousands of miles of small creeks and streams to make them safe for soybean growing; and the price of soybeans is now so inflated that many farmers can afford to grow crops even on marginal land that is flooded every two or three years. Industrial expansion, sprawling exurbia, and second-home developments consume tens of thousands of acres

each year. In the hills, uncounted miles of narrow bottomlands along creeks and stream branches are bulldozed to make room for even-age pine plantations in which even squirrels do not thrive.

To some extent, the costs of this destruction can be measured in practical terms: the bottomland forests are watersheds intended by nature to absorb much of the pressure of river floods. Without them, less and less water is required to induce rivers, at high-water stages, to overflow their man-made levees. Indeed, Corps projects that have prevented flooding in one area often create flood problems in another. Bottomland trees also act as anchors that hold the soft alluvial soils in place. In their absence, the amount of sediment carried by southern rivers is greatly increased—so much so that it impedes boat traffic, suffocates oyster beds, and chokes river outlets. In the case of the Atchafalaya River, the Mississippi's overflow outlet, this siltation problem has become so severe that Baton Rouge and New Orleans will be threatened in the event of a "super-flood." Then too, the bottomlands, like all wetlands, absorb and process pesticides and other chemicals. Without their ameliorating presence, hundreds of southern rivers become even more poisoned by pollutants than they would otherwise be. And finally in this list of measurable costs, there is the incalculable loss, in a region where a larger proportion of people hunt and fish than anywhere else in the nation, to a multi-billion dollar recreational and commercial fishing industry.

However, the assets of the hardwood bottomlands cannot be simply ticked-off like the stock on hand in a bankruptcy sale. For example, these forests are the place of last resort for most of the South's wildlife and an astounding array of rare and improbable plants. As the bottomlands of the Gulf Coast states diminish, the casualty list grows: red wolves and ivory-billed woodpeckers are very likely done-for. Outside of peninsular Florida only a couple of dozen nesting pairs of American bald eagles remain in the Gulf states. Ospreys are not much better off. In spite of dozens of supposed "sightings," the southern or Florida panther is almost certainly extinct west of the Florida panhandle. The swallow-tailed kite is exceedingly rare in all but a few large swamps. In the waterways, river sturgeon are uncommon. And the southern black bear, once the dominant resident of all great bottomland forests, is now reduced to a few remnant populations. Indeed, unless both the animal and its habitat are protected soon, it will be gone within the next few years from all the Gulf Coast states. On a less spectacular but more epidemic scale, unknown numbers of species and subspecies of amphibians and fish, their geography limited to particular river corridors, have been eliminated without ever being named or classified—like being buried in an unmarked grave.

*The distinctive eight-hoot call of the barred owl sweeps the night waters of the South.*

Even more adaptable creatures are largely dependent on the hardwood ecosystem. Southern deer, turkey, raccoons, and squirrels are ten to fifty times as numerous in the bottomlands as in comparable tracts of upland pines—especially now that those pines are being grown as even-age crops. The same is true of a host of songbirds from yellow-billed cuckoos to acadian fly-catchers. In Arkansas where the bottomlands have been particularly savaged, common wading birds like the egrets are becoming scarce; even large bullfrogs are no longer found.

More subtly, but just as importantly, the bottomland hardwoods are directly linked to all that is best in the "ecology" of human life in the Deep South. The world of plantations, sharecroppers, and riverboats now exists in a museum atmosphere, where it still exists at all. But the Big Woods—as William Faulkner called them (the particular ones he described are gone)—are, even in their retreat, what they have always been: the single most distinctive landscape in the region, and the one in which the area's cultural heritage is still most

firmly rooted. In the surviving streams and river swamps, millions of Southerners, out for a day's fishing, spend the most easy and unhindered hours of their lives. In the forests, watching for the gray twitch of a squirrel's tail, fathers begin to know their sons. In the chilly autumn mornings, friends become lifelong friends while listening to the belling of hounds. In short, the imagery of the alluvial river and its accompanying forest is the essential background for almost everything that remains stable, easy-going, and—in the best sense—conservative in Southern life.

Southerners are at last beginning to rouse themselves to fight for this vanishing heritage. State wildlife commissions are now straining their budgets to buy bottomland tracts for many millions of dollars that could have been acquired at one-tenth the price 15 years ago. In Louisiana, citizen groups are waging a long and uphill battle to force the Corps of Engineers to preserve the half-million-acre Atchafalaya Swamp, the largest riverine forest that survives in the South. Elsewhere, environmentalists have initiated numerous law suits in a not always successful effort to quell the Corps' unabated determination to "improve" coastal river systems.

In attempts to protect what remains of the bottomland hardwoods, no private citizens' group has been so variously and persistently involved as The Nature Conservancy. In the first phase of its struggle to save southern lowlands, the Conservancy concentrated its acquisition effort on the bottomland swamps of the Atlantic seaboard. The preservation of all or parts of North Carolina's Green Swamp, the Great Dismal Swamp in Virginia and North Carolina, the Santee Delta and Four Hole Swamp, and Georgia's Okefenokee was among the results of this campaign. During the last several years, however, the Conservancy has shifted its attention to the even more threatened river corridors in the Gulf Coast states, often working in tandem with State Heritage Programs that the Conservancy has helped to establish. Dave Morine, Vice President for Acquisition, who pioneered land acquisition in Mississippi at a time when the state had only three Conservancy members, argues persuasively that, unlike almost any other area in the nation—and in spite of the ecological damage already done—the Deep South still has the chance to impose a rational system of environmental inventory and preservation before the pressures of industrial growth and burgeoning populations destroy the rich inheritance of natural resources that still remains.

The Nature Conservancy has already completed several important projects, and there are many others "in the works." Acquisition of the Pascagoula Swamp in southeastern Mississippi is the Conservancy's greatest coup in the Gulf States thus far (see *The Nature Conservancy News,* Fall 1976). A 32,000-acre wilderness of hardwoods, cypress swamps, and oxbow lakes, it shelters scores of rare and endangered plants and wildlife, including the endemic yellow-blotched sawback turtle, the rainbow snake, and the odorless wax myrtle. Three years of complex and suspenseful negotiations ended in 1978 when the Conservancy bought the tract for Mississippi's Wildlife Heritage Program. Since then, the organization has added 3,000 acres to the management area and hopes eventually to extend the preserve all the way to the Gulf.

In the Pearl River drainage system on the Mississippi-Louisiana border, the Conservancy has been instrumental in helping the federal government to obtain an option for the purchase of 18,000 acres of dense bottomlands at the confluence of the Bogue Chitto and Pearl Rivers where, among other vanishing species, a few black bears are said to survive. The Conservancy is now concentrating on a 14,000-acre marsh-hardwood ecosystem at the mouth of the Pearl that is threatened by industrial and residential development.

Further east, in Alabama, the Conservancy is exploring the possibilities of protecting an immense, little-known bottomland forest in the delta of the Mobile and Tensaw Rivers—a wilderness seriously threatened by industrial expansion and the environmental overkill of the Corps' nearby Tennessee-Tombigbee project. In the Florida panhandle, the Conservancy is interested in protecting three river corridors—the Choctawhatchee, the Apalachicola, and the Suwannee. In the case of the Suwannee—whose headwaters are the Okefenokee Swamp—the Conservancy has already acquired 6,000 acres through purchase and donation, which will eventually be part of a large federal refuge at the river's mouth.

These areas and others like them are all at the last-chance stage. Either they will be saved in the next few years or they will not be saved at all. The Nature Conservancy is an old hand at "up-against-it" situations, but probably never before or again will its conservation skills be so strictly tested as in its current efforts to rescue the last great river forests of the Deep South.

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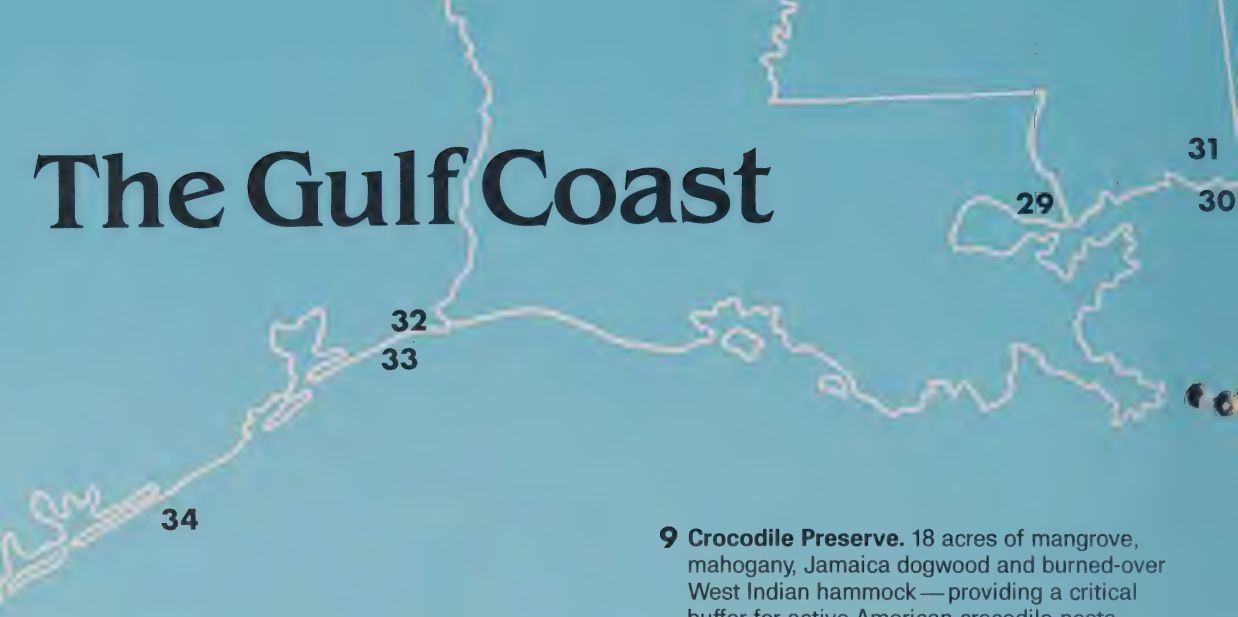
An environmental writer, **Don Schueler** is a regular contributor to *Audubon* and other magazines. He has recently completed two books, *Preserving the Pascagoula* (University of Mississippi Press) and *Incident at Eagle Ranch* (Sierra Club Books), both of which will be published in the fall. Dr. Schueler is also a professor at the University of New Orleans and a leading conservationist in Louisiana.

# The Gulf Coast




The Nature Conservancy has been instrumental in protecting the following areas along the Gulf of Mexico:

ALABAMA

**1 Alabama Gulf Coast Wildlife Refuge (Gulf Shores).** Trans-gulf migration site for numerous birds, including passerines in the spring and hawks in fall; 1,290 acres.

FLORIDA

**2 Akers Preserve.** 13-acre tract of slough and hammock, refuge for the American alligator and bald eagle.

**3 Robert Battey Wildlife Sanctuary.** 120 acres of swamp, estuary, and islets; seasonal habitat for ospreys, brown pelicans, great blue herons, and other birds.

**4 Big Cypress.** A 744-acre stretch of "wet" (sawgrass) prairie with cypress hammocks, which supplies vital fresh water to the Everglades and Ten Thousand Islands areas.

**5 Buck Key Preserve.** Rich in birdlife and Indian mounds, 189 acres of bayou, mangrove swamp, and shoreline.

**6 Buttonwood Rookery.** Mangrove islands which serve as nesting and feeding grounds for a variety of birds; 47 acres.

**7 Chassahowitzka National Wildlife Refuge.** A 526-acre area providing important seasonal habitat for waterfowl and wading birds.

**8 Corkscrew Swamp.** 5,760 acres of sawgrass marsh, lettuce lakes, and virgin cypress forest (the nation's largest stand) with trees well over 600 years old; habitat for the wood stork, great egret, and white ibis; occurrences of rare orchids.

**9 Crocodile Preserve.** 18 acres of mangrove, mahogany, Jamaica dogwood and burned-over West Indian hammock — providing a critical buffer for active American crocodile nests.

**10 Cummer Sanctuary of the Suwannee.** Two low river islands forested with hardwoods; habitat for wild hog, opossum, and alligator — and breeding site for wood ducks; 985 acres.

**11 Ding Darling Sanctuary.** 80-acre refuge for waterfowl and shorebirds; endangered species include bald eagle, peregrine falcon, and brown pelican.

**12 Fakahatchee Island.** 70-acre estuarine area containing largest untrammeled mangrove forest in North America, royal palms, orchids, rare mosses. Mammals include Florida panther, Everglades mink, and black bear.

**13 Gulf Hammock (Waccasassa Bay State Preserve).** One of the state's largest (26,285 acres) unsullied salt marsh estuary systems.

**14 Gulf Islands Preserve (Perdido Key).** 75 acres, stretching from the Gulf to Big Lagoon Sound, within the Gulf Islands National Seashore; sand beaches, dunes and swales, salt marshes.

**15 Lignumvitae and Shell Keys.** Two islands possessing all the representative flora of the Florida Keys as well as several threatened species such as the Florida fiddlewood and lignumvitae trees; 545 acres.

**16 Little Pine Island.** 4,259 acres of marine salt marsh, estuary, mangrove swamp, and barrier beach — habitat for the brown pelican, breeding grounds for fish and shellfish.

**17 Manatee Springs State Park (Cummer Tract).** River swamp supporting endangered fauna, including the American osprey and the sea mammal for which the park is named — believed to be the original "mermaid" of ancient sea-faring tales; 276 acres.

**18 Matanzas Pass.** 42 acres of estuary and mangrove swamp, with live oaks, sea oats, sabal palms; inhabited by a number of rare species including the indigo snake and gopher turtle.

**19 Osborn Sanctuary.** Salt marshes, mangrove forests, and islands of slash pine, live oak, and sabal palm. Bald eagles and brown pelicans hunt the shallow waters of the 640-acre area's Hendry Creek. Among its other denizens: Florida manatee and American alligator.

**20 John S. Phipps Preserve (Alligator Point).** 40 acres encompassing salt water marsh, marine shoreline, and lagoon.

**21 Porpoise Key.** A 20-acre portion of the Great White Heron National Wildlife Refuge, this mangrove-forested coral island is home to the endangered key deer and a diversity of birds.

**22 Rookery Bay Sanctuary.** 3,365-acre nursery and feeding grounds for a profusion of marine creatures, including numerous birds and fish.

**23 Sanibel Island Preserve.** From its wide swampy swales and seasonal ponds to its interspersions of sawgrass prairie and tropical hardwoods — this 601-acre area is a showcase for exotic flora; habitat for brown pelican, bald eagle, and American alligator.

**24 Sea Oats Beach.** Marine shoreline with sand dunes; important as a preserve for a state-protected plant, sea oats; 2 acres.

**25 Shired Island.** 5,300 acres of marl everglades and timbered swamp hosting a variety of mammals, ducks, and other birds.

**26 Snipe Key.** Coral island and cove forming part of the Great White Heron National Wildlife Refuge; other wildlife includes the key deer and peregrine falcon; 463 acres.

**27 St. Vincent Island.** 12,358 acres of unspoiled marsh, shore, and woodland with six major lakes and myriad wildlife species.

**28 Ten Thousand Islands.** Tidal marsh and mangrove islands providing buffer for the Everglades; breeding grounds for fish and shellfish; 5,060 acres.

LOUISIANA

**29 Louisiana Bottomland Hardwoods.** 18,420 acres within the state's most varied drainage system. Habitat for diverse mammals, birds, reptiles — and only known home of the ringed sawback turtle.

MISSISSIPPI

**30 Mississippi Sandhill Crane Sanctuary.** 8,195 acres of pine savanna and lower woodland swamp; key breeding site for Mississippi sandhill cranes.

**31 Pascagoula Hardwood Lands.** Wildlife-rich bottomland forests and wetlands along the Pascagoula River; excellent environment for a number of birds, rare plants, and snakes — and only known habitat for the yellow-blotched sawback turtle; 34,916 acres.

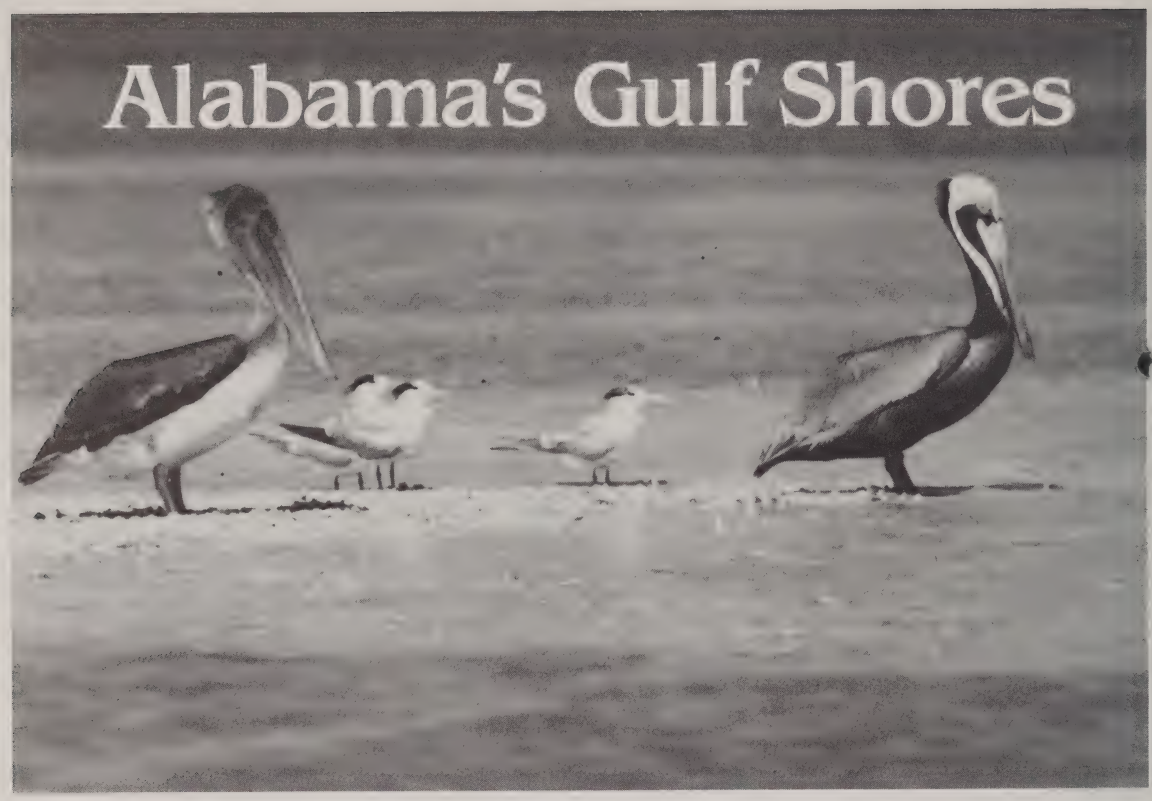
TEXAS

**32 McFaddin Marsh.** 41,682 acres of marsh and open water providing prime habitat for waterfowl, small mammals, and numerous alligators.

**33 Sea Rim Marsh.** Coastal prairie marshland of great value for the lesser snow goose and mottled duck. Other notable inhabitants of the 8,972-acre expanse include the peregrine falcon and red wolf.

**34 Smith Marsh.** 2,375 acres of marine marshland within the San Bernard National Wildlife Refuge — containing shallow lakes ideal for waterfowl, especially geese; bald eagles sighted in the area.

# Alabama's Gulf Shores



by Joy S. Davis

There is a belief that the pirates who found refuge in the bays and inlets along America's Gulf Coast centuries ago never recovered the glittering treasures they buried in haste. Dig in the right place, the legends promise, and you will discover great riches.

Today, the treasure hunters are urbanites seeking serenity and solitude. They walk the sun-bleached beaches, listen to the cadence of the waves, and gaze thoughtfully at the unchanging horizon. Perhaps what they are looking for is a sense of stability, elusive in the turmoil of everyday life, but perhaps inherent in nature.

To walk on the beach and explore its coastal environs is to be aware of nature's constant struggle to maintain stability, even as it subtly creates change. Restless tides cut changing patterns in the shoreline. Steady winds work like invisible fingers to build, shift, and shape the beach and dunes. Yet, all the while, a delicate balance prevails. Alabama's Ft. Morgan peninsula, a finger of land pointing west into the Gulf of Mexico near the mouth of Mobile Bay, has sustained Indian tribes, seen the arrival of French and Spanish explorers, borne witness to one of the most famous battles of the Civil War, and—only last year—survived the potential devastation of a hurricane. But not one of these events could forever mark the land as could the resort development that was proposed for the area in the mid-1970's.

Part of the Ft. Morgan peninsula has stayed pristine, and is considered by the U.S. Fish and Wildlife Service to be the best remaining undisturbed beach ecosystem between Pensacola, Florida, and New Orleans, Louisiana. A spectacular sweep of dunes highlights an 8,000-foot strip of snow-white beach. The diverse terrain, which encompasses fresh, brackish, and saltwater marshes, sloping woodlands, and swamp, provides habitat for six nationally endangered or threatened animal species—Atlantic loggerhead sea turtle, American alligator, peregrine falcon, bald eagle, brown pelican, and red-cockaded woodpecker. It also is a major stopover for migrating songbirds, and supports myriad small mammals, reptiles, and amphibians.

A 1,290-acre jigsaw puzzle piece of the peninsula, the Perdue property was purchased by The Nature Conservancy in 1978 for $5.4 million from Morprop, Inc., when development of a residential community, recreation center, and golf course threatened the locally known natural area. The property's diversity is reflected in its borders: on the south, the Gulf shoreline; on the east, 22,000 feet of marsh curving along saltwater Little Lagoon; to the north, some 400 feet overlooking the

tranquil Bon Secour Bay area of Mobile Bay; and on the west, a straight stretch of inland-to-sea flora from bay to Gulf.

Immediately behind and adjacent to Little Lagoon, separated by only a sandy ridge, is a 39-acre freshwater lake, called Alligator. Then, north of 'Gator Lake and the lagoon, much of the area is gently rolling woodland, thick with sand, slash, and longleaf pine, occasional red cedars, and a variety of oaks. Running intermittently through the woodland are a variety of dense shrubs—youpon, wax myrtle, red basil, gopher-apple, and saw palmetto.

The dune system of Alabama's Gulf Shores is complex: a series of ancient dunes, some rising over 20 feet, runs parallel to the beach. Closer to the shoreline are smaller foredunes, lush with marsh elder, sea rocket, and sea purslane. Graceful sea oats, dune morning glories, and bitter panic grass grow in profusion. The thick vegetation acts as a stabilizing force against wind and tide, and challenges the northern drift of the finely textured sand.

The beach is alive with familiar shorebirds—gulls, terns, curlews, skimmers, and sandpipers—that cruise overhead, plunge suddenly to the water for food, and come ashore to rest and preen. Amid all this activity, endangered brown pelicans sometimes fish offshore.

Peregrine falcons have a fondness for swooping low across the dunes, which may surprise people more accustomed to picturing the raptor in craggy, mountainous territory. The endangered peregrines find weakened migratory songbirds ideal prey, and enjoy perching on driftwood on the beach.

Inland, red-cockaded woodpeckers have been sighted; some local birdwatchers believe that a colony has resided within the pine forest for years. The Ft. Morgan area does offer suitable habitat for these elusive, endangered birds, which hollow out nesting cavities in pine trees decaying from red heart disease.

Ft. Morgan's isolation, location, and vegetation make it one of the primary landing and launching sites for songbirds on their pilgrimages to and from Central and South America. Weary travelers of the Atlantic and Mississippi flyways, the birds arrive at the tip of the peninsula and work their way east to the Perdue area where food is most abundant. Birders are treated to huge flocks of Eastern kingbirds, scarlet and summer tanagers, evening grosbeaks, prothonotary warblers, and gatherings of dozens of other species. There are also large numbers of migrating hawks, including broad-winged, Cooper's, and sharp-shinned hawks. Migratory waterfowl—red-breasted mergansers, lesser scaups, blue- and green-winged teals, and such familiar ducks as gadwalls, mallards, and canvas-backs—may stop at Ft. Morgan, but most do not winter there, preferring to continue to Louisiana bayou country.

Altogether, the area supports some 95 resident bird species, plus 37 additional nesting, 125 additional wintering, 82 spring and fall migrants, and a number of accidental or occasional species that appear because of unusual weather conditions or for other reasons. Nearly 350 species could conceivably be seen on the peninsula in one year's time!

The remarkable bird life is only one facet of an area teeming with wildlife. North of the dunes in 'Gator Lake, a sizable population of American alligators basks in the sun and feeds on plentiful fish called alligator gars. The Atlantic loggerhead turtle used to leave its eggs on Alabama's Gulf Shores. It is hoped that female turtles—attracted by the secluded beach—will again swim ashore, lay their eggs in shallow holes dug in the sand, and disappear into the deep, leaving the eggs to incubate and hatch.

In the woodlands north of Little Lagoon and 'Gator Lake, small furbearers and other creatures find refuge, including opossums, nine-banded armadillos, striped skunks, and bobcats. Foxes tunnel into nearby dunes and hollow out dens with dual entries.

Scattered moist low-lying areas and the swamps and marshes that surround the lagoon and lake provide habitat for raccoons, squirrels, and a native species considered endangered in Alabama: the Gulf Coast beach mouse. Though few vertebrates can tolerate the dune conditions on the Gulf of Mexico, the mouse thrives on the plentiful sea oats. Its range is notably small, restricted to approximately 30 miles of coast between Mobile Bay, Alabama, and Perdido Bay near Pensacola, Florida.

The peninsula's cultural wealth further enhances its natural value. Eight prehistoric sites lie along Little Lagoon; a particularly significant one is the Shell Banks Bayou Site where a 30-foot-tall sacred Indian shell mound stood until the 1930's. The preservation of archeological sites on the Conservancy's Perdue property will help assure that historic remnants of long-ago communities will endure, though severe erosion has already taken its toll.

As is the case with many natural areas the Conservancy has helped save, the movement toward protection began with concerned citizens who feared development of the pristine area. Conservationists, educators, civic leaders, and members of the Mobile Bay Audubon Society joined

*An American alligator reflects close to shore.*

forces and sought assistance. The Conservancy agreed to purchase the coastal wilderness and convey it, in time, to the U.S. Fish and Wildlife Service as the nucleus of a new national wildlife refuge.

There are numerous benefits to be reaped by nearby communities, from college field courses in dune ecology to informative trails for nature lovers. Meanwhile, the vital diversity of the ecosystem will continue to flourish, a living laboratory for scientists and a retreat for cityfolk.

The area's wild beauty remains unspoiled, despite its easy accessibility by highway and eight-mile distance from the Gulf Shores resort settlement. Like many coastal communities, the settlement has mushroomed in recent years, and there is a sorely diminished sense of communion with nature on the overcrowded beaches.

The people of Gulf Shores, like most Southerners on the Coast, are filled with hurricane lore . . . and a resulting heightened respect for nature's awesome forces. Still, they were stunned by the fury unleashed by Hurricane Frederic last September.

Frederic slammed into the coast at more than 130 miles per hour with 12-foot tides and howling gales that devastated everything in its path. The storm claimed eight lives (there was a mass evacuation), left $1.25 billion in damages, and reduced Gulf Shores' small businesses and homes to rubble. The beach cottages adjacent to the Conservancy's Perdue property were shattered and the pieces tossed like toys across Little Lagoon into the wilderness area. The foredunes and beach vegetation of the Perdue land bore the brunt of the storm, though the trees on the Gulf side were vulnerable. However, most inland flora remained intact, and so did the big dunes.

Three months later, the ravaged area is showing signs of recovery. Visitors see evidence of the maxim that nature is a great healer: delicate ridge patterns in the sand are a sign of small foredunes to come, and vegetation is sprouting anew. In fact, the vagaries of nature that sent Frederic rampaging over the coast may have provided some compensation for the wildlife. Although the Gulf Coast beach mouse will face a lean winter with a depleted supply of sea oats—and other resident species will have difficulties—the decaying natural debris left by the hurricane insures a bountiful crop of insects for next spring's thousands of transient songbirds.

The delicately balanced coastal ecosystem took one of the most violent storms in history in its stride. While nature makes no guarantees for the future, The Nature Conservancy can: Alabama Gulf Shores will not be destroyed by the earth's dominant species, *Homo sapiens*.

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A native of Mobile, Alabama, **Joy S. Davis** was the Director of Heritage Communications for The Nature Conservancy and is now a writer in the Office of Public Affairs, U.S. Fish and Wildlife Service in Washington, D.C. She is also a free-lance writer.

# 'twixt Sea, Sky, and Sand

by Elizabeth C. Mooney

"Man is rich," said Thoreau, "in proportion to the things he can afford to leave alone." The estuarine ecosystems of the Florida Gulf Coast are a resource of immense value and benefit to man—if only we can avoid tampering with them.

Up and down the west coast of Florida are protected areas where human intrusion has been kept to a minimum and Nature is holding her own against the threats of civilization. Within these undeveloped shorelands and their myriad waterways are cycles as regular as the seasons, recurrent and immutable, where the sun's energy is turned into plants and the plants become food for animals, drawing migrating fish from hundreds of miles away to the nurseries of the estuarine zone.

One of these untouched areas is Ten Thousand Islands, an immense tangle of low-lying, mangrove-covered isles. The topography of southwest Florida is very flat and low. At Naples, the low area narrows, giving way to an increasingly water-dominated environment ornamented with Carolina quartz sand dunes that dwindle south of Naples, at Marco. Here the sand beaches vanish before a wetland fringe growing ever broader and covered with mangrove. Shell beaches yield to the large waterways of Ten Thousand Islands. These dots of land sprawl southward from Marco Island to Chokoloskee Bay, which is inside the Everglades National Park. At the bay, the Park's ecology begins to change from a river dominated system to narrowing wetlands emerging at the shore in the maze of Ten Thousand Islands. In 1969 The Nature Conservancy and the Collier County Conservancy together acquired some 5,000 acres of the islands, which provide a buffer for the fragile Everglades. The property was subsequently transferred to the State of Florida.

Fakahatchee Bay, part of a chain of bays lying between the mainland and Ten Thousand Islands, is so shallow that sunlight easily reaches the bottom, causing grass and algae beds to flourish. The detritus formed by the breakdown of

these plants is the hook that draws a chain of life beginning with the smallest invertebrate and ending with large sea mammals, such as the porpoise and endangered Florida manatee.

Inland from the bay, the mangrove wetlands escape the sea's salty influence. The water is fresh, and the rivers, such as the Fakahatchee, are dark from the organic stain of the swamp. Dominated by water, the land is a mixture of marshes and swamps—the marshlands rife with sawgrass and black rush that ultimately yield to hammocks of cypress and finally to dry upland ground. One of the larger isles of the Ten Thousand chain, Fakahatchee Island floats at the edge of the bay. It is characterized by a large mangrove forest that also contains royal palms, orchids, and rare mosses. The 70-acre island was preserved by the two Conservancys and deeded to the state for care and management.

A bit north, near Naples, the protected estuaries of Rookery Bay also serve as rich feeding grounds for marine life. The 4,000 acres of Rookery Bay that were preserved jointly by the Conservancy, National Audubon Society, and the Collier County Conservancy include uplands, marshes, and tidal creeks. The land attracts a variety of wading birds, such as the spectacular white ibis. Fond of crayfish and cypress trees, ibises nest in fresh-water glades, preferably cypress lagoons, and lead their greyish-brown fledglings to the bay's salt marshes to mature. Not until the next nesting season will the young ibises take on the white plumage, black wing tips, and red legs of their parents.

The endangered brown pelican is not an uncommon sight at Rookery Bay, striking with a great splash for fish that it carries in its huge pouch. The bald eagle, giving way to humans elsewhere, still circles over the bay. In the estuaries, the shy and gentle, nearsighted manatee concentrates on its vegetarian meal, preoccupied with feeding its elephantine bulk. The manatee is one of the survivors of a large number of its kind, which formerly ranged along the coast from the Carolinas down along Mexico, reduced now to somewhere between 600 and 1,000 scattered individuals. The major threats to the manatee are habitat destruction, pollution of its waters and food sources, human molestation, and boating accidents.

The manatee's world—and that of the pelican, ibis, and bald eagle—was badly threatened in 1964 when a road into the Bay area was proposed, with massive development right on its heels. Conservationists banded together and the proposition was shelved. Now the finfish and shellfish that must pass part of their lives in shallow estuary waters will find their nurseries undisturbed.

North of Rookery Bay, midway on the Florida Gulf Coast, lies Sanibel Island, which once overflowed with wildlife—Florida panther, bobcat, and nearly every variety of bird that flourishes in subtropical and temperate climates. The Caloosa Indians made Sanibel their home. They were followed by Spanish pirates. Until the 1960's, the island was unreachable except by boat—a fact that discouraged many visitors.

In 1963 a bridge was built to the mainland and realtors began advertising "the sounds of silence at Sanibel." Attracted by pristine, shell-strewn beaches bordered by beach madder, plum, and sea oats, a surge of tourists bombarded the island like the vanguard of an invading army.

Alarmed by what was happening, conservationists began, little by little, to purchase Sanibel land for use as a wildlife refuge. A memorial committee honoring Jay N. "Ding" Darling, who fathered the Migratory Bird Conservation Committee and designed the first federal duck hunting stamp, established a sanctuary on the island in his memory. The Conservancy and its Florida chapter have contributed acreage to the federal Ding Darling Refuge, as well as to the adjacent Sanibel Island sanctuary, which is owned and cared for by the Sanibel-Captiva Conservation Foundation. Today the preserved island is one of Florida's most spectacular sights, harboring 300 different species of plants and 240 species of migratory birds.

One third of the country's roseate spoonbill population resides along an area of the Ding Darling Refuge that is drained by the tides and dotted with mangrove. In the shallow waters, snowy and great egrets feed on the chubs, and black skimmers work the waters, their long unequal red bills agape in anticipation of their catch. Each spring in April, warblers by the thousands appear in company with indigo and painted buntings. Osprey nest on the channel markers, circle the skies, and interrupt their flights to plunge feet first after a fish. Loggerhead turtles lumber up the dark beaches to lay their eggs and then return to the sea. The air is sweet with the smell of night-blooming cereus.

Just last year The Nature Conservancy transferred a 189-acre island known as Buck Key to the Ding Darling National Wildlife Refuge. Lying just a bit north of Sanibel Island, the key was donated to the Conservancy by Mrs. Elena Duke Benedict of White Plains, New York. The island contains, among other massive vegetation, one of the largest Jamaican dogwoods in Florida. Much of Buck Key is covered with semi-tropical gumbo limbo, cabbage palms, and the grotesque strangler fig, while part is a mass of black and red mangrove. The shell mounds left by the In-

*Florida panther*

dians, many of which provide perfect habitat for the tropical hammocks, are relatively undisturbed—safe for interested archeologists. Alligators inhabit Buck Key and river otters are commonly sighted.

Still farther north, Shired Island—acquired by the Conservancy and its Florida Chapter—is a true wilderness located at the mouth of the Suwannee River. Much of the 5,300 acres is swamp and salt marsh, a largely submerged wild world. Alligators, threatened in Florida, are making a comeback along the borrow ditches left by the construction of timber roads, and hatchlings are a common sight. A bald eagle has been observed, and there may well be more since the area is ideal for nesting. Osprey are fairly abundant and nest throughout the coastal marsh of the Suwannee where the river enters the Gulf. Whitetailed deer browse on Shired Island and occasional tracks suggest black bear and bobcat. Otters play in the canals and chase 54 species of fish. During the winter manatees visit the estuaries on the Suwannee, seeking their vegetation.

Along the flood plains of the Suwannee River, water tupelo, water ash, water locust, and bald cypress grow undisturbed. Dark waters feeding the small tidal creeks have their source in the timbered swamps where freshwater and saltwater marshes are locked in a struggle for dominance. In the sawgrass ponds, king and clapper rails feed. Large rafts of redhead ducks winter off the coast and drift, sometimes 100,000 strong, onto Shired Island.

Farther up the Lower Suwannee, where the river is wide and meandering, its waters pure and spring-fed, lies the Cummer Sanctuary. Dr. George Cooley initiated the acquisition of this unspoiled area, which consists of property on the bank of the Suwannee and two low-lying islands in the river. Alligators, wild turkeys, opossums, and quails inhabit the forest and swamp of the 985-acre preserve. Ducks overwinter on the river itself, which teems with many species of brim and bass. The sanctuary was donated to the Conservancy in 1971 by the Cummer family.

Directly below Apalachicola, which sits at the mouth of the Apalachicola River, lies another wild beautiful island once owned by Dr. Raymond Pierce, a patent medicine king. St. Vincent Island, now under the protection of the U.S. Fish and Wildlife Service since The Nature Conservancy purchased it in the late 1960's, is comprised of freshwater ponds and tidal marshes. Fifteen-foot-high sand dunes dot the terrain. Tall magnolias and great spreading live oaks grow side-by-side in the island's interior. Nature has remained undisturbed on St. Vincent—one ogeechee tupelo tree is said to be the largest of its kind anywhere.

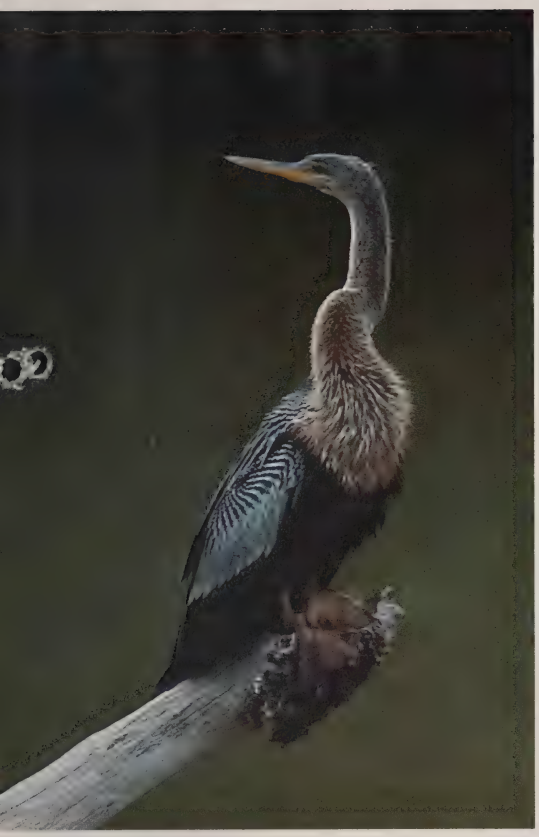
Indians lived on the island centuries ago leaving behind piles of oyster shells from their feasts, shards from their pottery, as well as the burial grounds of their ancestors. Since access to the property is limited to conservation-minded groups, the middens have been preserved.

St. Vincent is a refuge for many beleaguered creatures—ospreys, eagles. Brown pelicans can be seen plunging headlong into the water; loggerhead turtles and a few leatherbacks nest on the beaches. There are also some exotic animals. Dr. Pierce introduced the sambur deer from Asia and Indian black buck. The deer have thrived on the island and are now protected.

South, below the mouth of the Suwannee River, lies another lovely wilderness sanctuary with a sense of remote vastness. Waccasassa Bay State Preserve comprises one of Florida's largest and richest untouched saltmarsh estuary systems. Winding through the sanctuary, the West River finds its way 'round seemingly endless expanses of salt marsh, cord grass, black grass, and black needle rush, as well as through hydric hardwood hammock alive with red cedar, cabbage palmetto, and live oak. Waccasassa's creeks are filled with oyster bars, and its inshore area is a complex wetland system. The Florida panther is making a stand in the preserve, along with the bald eagle.

Formerly known as Gulf Hammock, Waccasassa Bay State Preserve contains 26,285 acres. The Conservancy coordinated a 7,000-acre gift from the Georgia-Pacific Corporation to the State of Florida and then assisted the state in purchasing the additional 19,285 acres.

*Top: A Gulf mammal at home, the Florida manatee; above: the white ibis, which makes a low, harsh call, is often seen in flocks scouting the coastal skies; right: a brown pelican rises as sun sets on Sanibel Island.*



*Left: a female anhinga. Spearing fish with their bills, these birds often swim neck-deep in fresh southern waters; below: a constellation of roseate spoonbills. One third of the nation's population of these birds, which attain their splendid plumage only after three years, is found on Sanibel Island.*

At the very tip of the peninsula on the east side of Franklin County, directly below Tallahassee, is the John S. Phipps Preserve, also known as Alligator Point. Donated to the Conservancy via the Florida chapter last year by Mr. and Mrs. Phipps, the 40-acre point is a priceless gift. Not only is it a major staging area for monarch butterfly migrations, but a landfall for warblers flying north in the spring. On the east the property is covered with slash pine woods; on the harbor side it is laced with tidal creeks that form yet another of the Florida Gulf's wetland systems.

Alligator Point is leased to Tall Timber Research, Inc., of Tallahassee, a conservation-oriented scientific research firm interested in natural history and ecology. Bruce Means, Director of Tall Timber, says that the organization has been "very successful in restoring the tip of the point."

Up until this year, the preserve's beach—once a favored breeding ground of the least tern—was empty of the rare bird's nests. The tiny tern with the white forehead requires bare land to nest and is extremely vulnerable to dune buggies, campers, and picnickers—all of which constantly disturb its eggs. In addition, the least tern, a victim of the booming Florida real estate market, has never made a comeback from the feather trade slaughter that occurred at the turn of the century. The bird is listed as threatened in Florida.

This year Tall Timber began an intense educational campaign to convince beach strollers, who are able to reach the Phipps Preserve beach from below high tide mark, that protecting the beleaguered least tern is their fight as well. The conservation/research group denied access to the area where it could and posted illustrated pleas to leave the terns' nests alone. This past spring Tall Timber counted 120 nesting pairs—the unmolested beach drew birds from miles around.

With wildlife rapidly losing shorefront habitats to humans, what is happening at Alligator Point is heartening. It also demonstrates that some of our country's greatest treasures are most precious when they are left alone, especially the vital estuarine ecosystems and shorelines of Florida's Gulf Coast.

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**Elizabeth C. Mooney** is a free-lance writer whose articles have appeared in *American Heritage, Defenders, Newsday, McCall's,* and the *Washington Post.* She is also the author of three children's books; and *In the Shadow of the White Plague* was published last year by Crowell.

# Lone Star Marshlands

Texas is the land of Sam Houston, of Burnett, Lamar and Jones, of six flags, of LaSalle, Cabeza de Vaca, Jean Laffite . . . and of one of the most productive coastal areas on the Earth.

Rimming the western edge of the Gulf of Mexico—from Beaumont to Brownsville, Texas—over 3 million acres of coastal habitat began forming some 60 million years ago. The process continued during the great ice age, when the waters of the Gulf receded for nearly a hundred miles. But at the same time, far to the north, retreating glaciers sent their waters rushing south to the sea. Consequently, the waters of the Gulf rose and fell back, then rose and fell again, and again. . . .

As the Gulf waters dropped, rivers scoured their channels and ran dry. The replenished sea then flooded the empty basins, creating long estuaries and lagoons along the coast. Barrier islands arose, formed by sand and shells from the ocean floor, swept up by currents and tides, thereby protecting the lagoons and estuaries from the open Gulf and bringing a rich abundance of microorganisms that provided food for a great diversity of sea creatures. The life of the sea in turn lured animals from the land and sky, forming a habitat now internationally recognized as one of the finest in the world: the Texas Gulf Coast.

Over 400 species of birds—including many that are endangered—have been recorded along the half-million acres of tidal marshes. The Texas wetlands are the first landfall for many spring migrations of birds heading north, and a critical resting and feeding ground for fall migrating birds traveling farther south. Up to two-thirds of the entire wintering waterfowl population using the Central Flyway have been inventoried in Texas. In 1975-76, 12 different species of ducks and geese, such as blue and green-winged teal, canvasback, redhead, and pintail ducks, and lesser snow and white-fronted geese, brought more than 90 percent of their populations to the Gulf Coast wetlands.

Joe Lagow, a Texas Coast rancher, described some of the area's winter residents: "In the big marsh . . . these wintering waterfowl gather there in the evening. There's anywhere from 125,000 to a half-million geese roosting each night . . . the Canadians, the white-fronts, snows, blues, and the Ross's geese all use the area. In the mornings they come out just like airplanes, flying in one drove after another. Sometimes it takes as long as three hours for 'em to go out to their feeding areas in the rice fields. It's quite a sight."

The marshes of the Gulf Coast are highly important not only to waterfowl, but to all sorts of creatures. Because they trap nutrients from both land and sea, the productivity of marshlands dwarfs that of all but a few other exceptional ecosystems. For instance, commercially valuable

shrimp are dependent on the organically rich marshes as nurseries and breeding grounds. "Texas is the leading state in the production of shrimp," explained Bob Mauerman, executive director of the Texas Shrimp Association. "We account for about 79 percent of the total value of the entire nation's shrimp crop, in the Gulf of Mexico."

Several federally endangered species are dependent on coastal Texas: eastern brown pelican, whooping crane, peregrine falcon, Atlantic ridley turtle and leatherback turtle, southern bald eagle, and red wolf. State protected birds that find refuge on the coast include osprey, white-faced ibis, reddish egret, wood stork, and least tern. American alligators, threatened in most areas, are found in large numbers in the upper coastal areas of the state. Off-shore waters of the Gulf harbor a treasure trove of marine mammals: endangered blue, finback, and right whales, as well as manatees. Protected dolphins include the bridled, rough-toothed, and spotted.

But the end of this unique, rich land and its diverse array of species may be in sight. Once thought large enough for every kind of development, the Texas Gulf Coast is being encroached upon at a pace faster than nature can withstand. Vast ranchlands, whose size formerly protected many pristine areas, are now being broken up into smaller parcels to satisfy inheritance taxes and pressures for development. Land-use practices are changing. Fresh-water ponds are being drained. Shrimp, shellfish, and other food sources are under stress. Wildlife, for lack of space, is being forced to concentrate in numbers beyond the limits of health and safety. Rancher Lagow said, "I hate to think what'll happen to this area in the next 25 years, since in the previous quarter century, about 75 percent of the marshes and wetlands in Chambers County have been drained and destroyed."

If left unchecked, as they have been in other states, these changes can result in biological and economic devastation. There are always consequences to excessive alteration of the environment, consequences that can cause the environment to work against the people. In an ecosystem of the size and richness of the Texas Gulf Coast, no species, including *Homo sapiens*, stands alone.

In 1976 the U.S. Fish and Wildlife Service initiated a coastal wetlands program to preserve areas lying along the Texas Gulf Coast that are most vulnerable and have high value to migratory birds. To determine which sites need to be protected, Fish and Wildlife gathered together a group of conservationists having the most knowledge of Texas Coast waterfowl—their habitats, needs, and movements. The group identified 25 "key" areas

of waterfowl habitat, comprising almost 3 million acres of marshes and wetlands. Of this acreage, 286,000 acres must be preserved in order to adequately protect the habitat. In addition, the group ranked the 25 sites according to degree of threat and biological importance to wintering birds. The areas would be set aside, either through purchase or conservation easement, to insure the integrity of the Texas coastlands.

Through cooperative efforts of the Fish and Wildlife Service and The Nature Conservancy, 3 of the 25 "key" sites have already been preserved. Ranked as number 11 out of the 25 areas, Smith Marsh was purchased by the Conservancy in 1977 and later transferred to Fish and Wildlife for inclusion in the adjacent San Bernard National Wildlife Refuge. The 2,375-acre marshland contains several shallow lakes that provide ideal habitat for waterfowl, especially geese. Its coastal waters encompass a shrimp, finfish, and blue crab nursery, and an oyster reef. Endangered bald eagles have been sighted in the area.

The Conservancy acquired the second site, Sea Rim Marsh, in late 1978, and immediately transferred it to Fish and Wildlife. It is listed as number 5 out of the 25 top priority areas. Encompassing 9,000 acres of marshland, the property is of high value for lesser snow goose and mottled duck and also provides habitat for arctic peregrine and red wolf. Actually, the red wolf (*Canis rufus*) is believed to be nearly extinct in coastal Texas, which—along with a small amount of land in southwestern Louisiana—comprises what remains of its original range (about one percent). In addition to conflicts with ranchers and farmers and high mortality from internal and external parasites, the wolf's greatest threat is the coyote. Because it has been banished to such a small habitat, the red wolf is being "genetically swamped" by interbreeding with far more numerous coyotes and, on occasion, with feral dogs.

*Red wolf*

In an effort to save the little wolf (perhaps 50 pure red wolves remained in the wild), Fish and Wildlife established a program in 1973 to recover and preserve the remaining animals and breed them in captivity. (Genetic purity is determined by close observations, weighings, taxonomic measurements, and x-rays.) Since '73, most of the "real" wolves have been removed from coastal Texas and Louisiana, a successful breeding program is continuing at the Point Defiance Zoo in Tacoma, Washington, and the recovery team has been experimenting with relocating red wolves in areas where they cannot interbreed with coyotes.

Also prime habitat for *Canis rufus* and peregrine falcon, McFaddin Marsh is the largest coastal area yet acquired by the Conservancy for inclusion in the Fish and Wildlife Service's wetland preservation program. The 42,000-acre site (number 4 out of the 25) is composed mainly of marsh with some upland and open water. In addition to containing prime waterfowl habitat, especially for dabbling ducks and geese, McFaddin supports muskrat and otter. Its fresh water is ideal for numerous alligators, while the marsh waters harbor a highly productive finfish and shellfish nursery. McFaddin encompasses the greatest remaining stretch of unprotected coastal prairie marshland on the Texas coast.

Thanks to the Conservancy, the U.S. Fish and Wildlife Service, and the Governor of Texas, William Clements, the fragile and vulnerable Texas Gulf Coast—one of the most productive areas in the world—is being saved, bit by bit. But the danger signals are still there, whether they are oil rigs or high rises. Sam Houston, Davy Crockett, James Bowie . . . Texans have always rallied to defend their land, and now they need our help. Let's not let them down. Their loss would be our loss as well.

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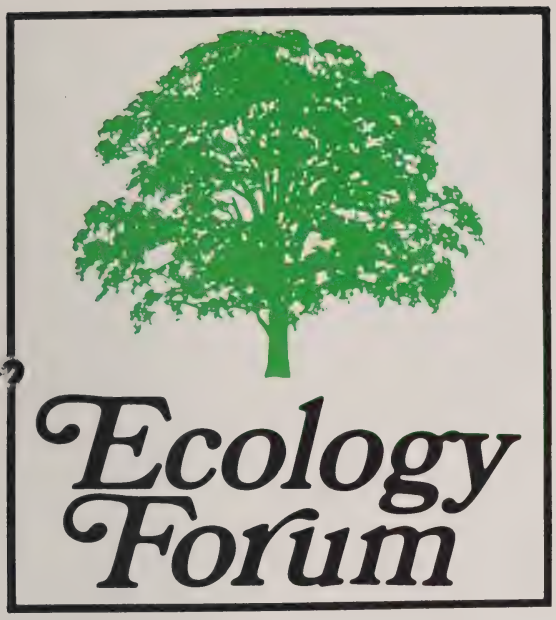
**Anne M. Byers,** Associate Editor of the *News*, adapted this article from a film entitled *This Time Forever*, produced by the Public Affairs Office of the U.S. Fish and Wildlife Service in Albuquerque, New Mexico.




No. 35

by Joseph W. Jacob, Jr.
Coordinator, Mississippi Heritage Program

## STREAM CHANNELIZATION: SUBVERTING OUR WETLANDS

In the Gulf Coast states, a most devastating assault on the natural environment is stream channelization—a controversial floodplain management technique that ranges in scope from the simple removal of fallen trees and debris lodged in the upper reaches of a stream to the concrete containment of once-fecund aquatic systems.

The four federal agencies that have been primarily responsible for channelization or "channel improvement," as they call it (the Soil Conservation Service, the Army Corps of Engineers, the Bureau of Reclamation, and the Tennessee Valley Authority), claim the method has many virtues: flood control, restoration of stream-flow capacity, bank stabilization, recreational and economic benefits. But for years, scientific evidence has existed to disprove these claims.

In the Southeast, the channelization process most often involves clearing a strip of land (up to 300 feet wide on either side of a stream) of all vegetation to provide working space for heavy equipment. The result is an engineered drainage ditch—a straight gash across the countryside—that is almost totally devoid of life. Bulldozers and draglines claw out the rich mud along the sides and bottom of the stream, piling it into high, steep banks which bleach sterile in the sun. This ditch or "channel" keeps the land immediately surrounding it dry, draining off rain water so fast and furiously that the flow erodes the banks and causes aggravated flooding (sometimes bridges are washed out) and siltation downstream.

Other side-effects of stream channelization include lowered water tables, reductions of fish and wildlife populations, and destruction of aesthetic and recreational values. And yet millions of acres of wetlands throughout our nation have been drained in this fashion. During the past 50 years, all major streams and associated wetlands in the delta region of Louisiana, Mississippi, and Arkansas have been affected. Less than 10 percent of the original bottomland hardwood forests in western Mississippi still remain—and those in northeastern Louisiana were being cleared at a rate of 110,000 acres per year in 1971, which could spell their depletion by 1991.

Eight years ago, the U.S. House of Representatives conducted hearings on stream channelization. Conservation organizations, state and federal agencies, scientists, and concerned citizens presented comprehensive and convincing evidence on its many adverse effects. Nonetheless, channelization continues. The public simply does not yet understand the procedure or appreciate the manifold values of leaving streams and wetlands unaltered.

In an economic survey of public opinion on wildlife recreation in the Southeast, made by Georgia State University in 1974, 81 percent of those surveyed had never even heard of channelization. Of those who had, many were wildlife recreationists—fishermen, hunters, and trappers—who held that channelization did not cause flooding downstream or disturb fish and wildlife populations.

Evidence is to the contrary, of course. Fish population studies in Mississippi demonstrate that channelized streams support fewer varieties and less total poundage of fish. The Tippah River in the northern region of the state supported 240.7 pounds of fish per surface acre before channelization. The river's average depth was five feet—with holes as deep as eight. There were fish of many different species and various sizes. But two years after channelization, the Tippah was a long, straight ditch with an average depth of one foot and isolated spots up to two-and-a-half feet deep. Holes, riffles, and bordering trees had disappeared. Only 4.8 pounds of fish per surface acre were found—a mere two percent of the pre-channelization numbers—and more than 80 percent of that poundage was composed of minnows. Where the channel stopped, the water had spread out through the woods and deposited silt deep enough to de-

stroy approximately 1,000 acres of timber. A federal court recently found that channel-work in the upper reaches of the Tippah River actually caused siltation of the lower reaches, resulting in higher-than-normal flood waters in 1973.

Swamps, marshes, and bottomland hardwood forests can absorb up to 16 times their weight in water. Natural streams and wetlands have long been nature's method of flood control, temporarily storing excess water in this manner, and gradually releasing it when the downstream flow is ready to accommodate run-off. The benefits of this natural sponge-like action are many. While providing a supply of water during dry periods, wetlands also act to recharge groundwater aquifers and maintain water tables. The thick mantle of wetland vegetation filters pollutants from upstream discharges and prevents undue increases in water temperature, thus inhibiting evaporation and aiding oxygenation.

In addition to distributing enriching nutrients to the fish and wildlife of the forested floodplain, natural streams are the life's blood for coastal estuaries—the nursery grounds for the Gulf Coast fishing industry—supplying them with the vital fresh water that mixes with salt water to produce the marvelously rich, brackish estuarine environment. There is little disagreement within the scientific community that natural streams and associated wetlands are absolutely essential to the continued health of this fertile, fragile ecosystem.

Various private, state, and federal agencies are working to preserve natural streams and wetlands; and The Nature Conservancy is no stranger to this critical effort. But acquisition of a portion of a floodplain and a contained stream segment does not assure protection. For example, the purchase of some 35,000 acres of bottomland hardwood forest and more than 40 miles of the Pascagoula River by the State of Mississippi, with the Conservancy's aid, will not secure the future of this vital area if channelization of the upper tributaries (such as Okatoma Creek and the Chunky River) occurs as planned. Stream bank erosion would increase, if such channelization were to occur, because of the greater water velocity in the new channels. Sheet flow erosion—which happens when water flows in a sheet across the land without cutting a main channel—would worsen in the floodplains without sufficient vegetation to bind the soil together. Unchannelized downstream segments would soon become clogged with silt, and further flooding would deposit coarser grained particles, such as sand, in the lower floodplain. Furthermore, the draining of the surrounding lands could result in increased clearing of the floodplain as land-owners seek new farmland. Soon the richness of the Pascagoula area, with its productive bottomland hardwood forest habitat, would be subverted—and with it, the natural qualities for which it was purchased.

Clearly, careful examination of the problem is in order. A few Southeastern states—Louisiana and Georgia among them—have enacted legislation to preserve selected streams in a free-flowing condition. For those states which have not, the Channel Modification Guidelines signed by the U.S. Fish and Wildlife Service and the Soil Conservation Service in 1978 may provide a limited form of protection. The basic assumption of the guidelines is that radical channelization—the kind which involves the removal of vegetation from both sides of the stream and alteration of the streambed itself—should be a last resort. Under these provisions, if the Fish and Wildlife Service and the Soil Conservation Service at the local level cannot agree on a channelization method to be used, the issue will be resolved by these agencies at the national level.

While this seems a good first step toward reassessing the channelization process and learning to treat our wetlands with care, there is much more to be done. Our citizens and our agencies must come to terms with the fact that nature's way of regulating nature will work—if only we can regulate our interference.

## 1980: YEAR OF THE COAST

A national campaign to inform citizens about the multiple values of their 100,000-mile shoreline, and alert them to the crisis which besets it, was launched last spring by a coalition group called the Coast Alliance. The Alliance designated 1980 the Year of the Coast, an idea which President Carter endorsed in his August environmental message.

For further information on the Coast Alliance and its activities, write:

Coast Alliance
P.O. Box 2708
Washington, D.C. 20013

## COTTAGES AVAILABLE AT MILE HI

Modern housekeeping cottages overlooking a mountain creek are available for rental year-round at the Conservancy's Mile Hi Ranch. Located 90 miles southeast of Tucson in the Huachuca Mountains, the Mile Hi stretches across the mouth of Ramsey Canyon, one of the most lovely and biologically diverse canyons in southern Arizona.

To arrange a visit or obtain a brochure and birdlist, write: The Mile Hi, RR 1, Box 84E, Hereford, Arizona 85615. Phone: (602) 378-2785.

# NEW PROJECTS

**Florida**

FLORAGLADES SANCTUARY—Addition—(Glades County). Everything a Floridian freshwater environment could offer can be found within the Floraglades: ponds of varying depths, swampland with tremendous old-growth cypress, wet prairie, pine woods and cabbage palms, hammocks of giant oaks. This 5-acre acquisition enlarges the 70-acre sanctuary, a 1977 gift of Jessie Freeling, who will act as preserve manager. Among the other riches of the area are orchids, vines, and ferns, exceptionally large old-growth slash pines, the sundew (*Drosera brevifolia*)—an insectivorous plant that is very rare locally—and otters. The Conservancy's Florida Chapter is presently raising funds to cover the purchase of the addition.

**Maryland**

POTOMAC RIVER ISLANDS—Zihlman's Island Addition—(Allegany County). The 80-acre island near Cumberland is verdant with mixed hardwoods: sycamores, silver maples, box elders, black cherry and ash trees, white oaks, and honey locusts. Deer, rabbits, foxes, and squirrels—game species typical of such upland environments—are denizens of these woods. This addition to the Potomac River Islands preserve has been transferred to the state's Department of Natural Resources.

**Michigan**

GOOSENECK LAKE (Mason County). The acquisition of two tracts totaling 330 acres in the Manistee National Forest protects the entire shoreline of Gooseneck Lake. The clear, sandy-bottomed waters are surrounded by a shallow marsh providing prime nesting habitat for greater sandhill cranes. Bald eagles have also been observed here. Gooseneck Lake will be transferred to the U.S. Forest Service for management.

TETTEGOUCHE (Lake County). Embracing the shorelines of four wilderness lakes, this magnificent 3,400-acre forested expanse lies just 60 miles from Duluth. Animal life typical of the northern mixed deciduous and coniferous forest zone—black bear, moose, timber wolf, white-tailed deer—is abundant in this extreme northeastern corner of the state. Glacial cliffs, ridges, bogs, and waterfalls make Tettegouche a scenic delight. Nominated for state park status since the early 60's, the area will be transferred to the Minnesota Department of Natural Resources.

**Montana**

POINDEXTER SLOUGH (Beaverhead County). Brown, rainbow, and brook trout frolic in the

clear waters of Poindexter Slough, one of Montana's most productive spring-fed creeks. The Conservancy has purchased 443 acres of the flat river bottom, thereby protecting habitat for sandhill cranes and red-tailed hawks. The land has been conveyed to the Montana Fish, Wildlife and Parks Department for management.

T B M RANCH (Powell County). 1,250 acres of native grasslands and cottonwood-pine forest border the Blackfoot River, due east of Missoula. Minks and bobcats, coyotes, elk, and white-tailed deer inhabit the area along with waterfowl such as geese and sandhill cranes. The river waters support a teeming fish population, including rainbow, cutthroat, and brown trout. The property was acquired by the Montana Fish, Wildlife and Parks Department with the Conservancy's assistance.

**New York**

GRIFFITH PRESERVE — Addition — (Suffolk County). Another gift of Eleanor B. Griffith, this 2-acre tract brings the size of the preserve to 12.5 acres. A wild remnant of Long Island's south shore, the property is valued for its upland hardwood forest and tidal marsh. The mature oak and hickory woods include trees which are several hundred years old. The area is managed by the Conservancy's Long Island Chapter.

**Rhode Island**

CLAY HEAD—Addition—(Washington County). Located on the northeastern shore of Block Island, the 32-acre property provides public access to the 145-acre Lapham easement and Clay Head Cliffs. In addition to serving as an important buffer for the Lapham easement, Clay Head contains a 6-acre swamp and pond complex used as a feeding area by black-crowned night herons and other birds. The tract will be transferred to the Rhode Island Department of Environmental Management.

**Tennessee**

RADNOR LAKE (Davidson County). Lying inside the Nashville city limits, this 133-acre addition to the Radnor Lake State Natural Area protects essential watershed for the lake. The area's variations in elevation provide a wide variety of habitats including sloughs and north- and south-facing slopes. The Tennessee Department of Conservation will manage the area.

REELFOOT LAKE (Obion County). The 43 acres are critical buffer for the Reelfoot National Wildlife Refuge, which is habitat for the nationally endangered bald eagle. Over 242 bird species winter in the refuge—among them mallards, American widgeons, egrets, cormorants, and anhingas. The property will be leased to and managed by the U.S. Fish and Wildlife Service.

**Wisconsin**

NAMAKAGON PRESERVE (Bayfield County). 40 acres of upland hardwood forest shield the Forest Lodge nature trail, a private facility open to the public. Funding for purchase of the area was provided by the Mary Livingston Griggs and Mary Griggs Burke Foundation. Namakagon will be transferred to the Cable Natural History Museum for Management.

RUSH CREEK BLUFFS—Addition—(Crawford County). Bounded on three sides by the 994-acre Conservancy preserve, this 26-acre tract of bottomland hardwood forest is a nesting site of the red-shouldered hawk. Rush Creek flows through the parcel and into the Mississippi River. The area may be conveyed to the State of Wisconsin for management.

ARTHUR AND ALBENA SNAPPER MEMORIAL PRAIRIE (Jefferson County). Funds for the purchase of this 30-acre tract were provided by Joan Heymann and Arthur Snapper, Jr. Located in the Crawfish River floodplain, the property contains 22 acres of virgin prairie, harboring the white lady's slipper and prairie milkweed—both endangered in Wisconsin—as well as the small yellow lady's slipper and prairie plantain, threatened in the state. Upland sandpipers nest here along with bobolinks and savanna sparrows. The area will be managed by a committee of the Conservancy's Wisconsin Chapter.

## West Chicago Prairie

Until recently this 154-acre stretch of prairie, marsh, and savanna, the largest natural area in DuPage County, was slated for development as part of an industrial park. Without the intervention of the Conservancy, Illinois could have lost—in this single parcel—one-eighth of its remaining mesic/wet-mesic prairie.

The tract supports 350 plant species, more than 40 percent of all species native to the county including the federally threatened white lady's slipper orchid (*Cypripedium candidum*) and the state-endangered sedge (*Carex crawei*). Just 35 miles west of Chicago, this essentially undisturbed grassland provides habitat for the Massasauga rattlesnake, the marsh hawk, and divers ground-nesting birds, as well as more common species such as deer and raccoon.

Former West Chicago Mayor Richard Truitt was the first to take note of the prairie's existence, in 1975, and to call it to the attention of the DuPage County Forest Preserve District and The Nature Conservancy. The land has been conveyed to the City of West Chicago and the preserve district for management as a state nature preserve—open to the public for research, environmental education, and appropriate recreation.

## Conservancy Preserves Receive International Recognition

On December 12, the Conservancy received word that two of its preserves, the Virginia Coast Reserve and the Konza Prairie in Kansas, had been named international biosphere reserves: an acknowledgement given to only 162 natural areas in the world, 33 of them in the United States.

Nominations were considered and approved by the International Coordinating Committee of the Man and the Biosphere Program—part of the United National Educational, Scientific and Cultural Organization (UNESCO)—in Paris last July.

The goals of the biosphere reserve network are: to conserve the integrity of biotic communities within natural ecosystems, to safeguard the genetic diversity of species, and to provide areas for ecological research and education.

## Chapters Receive Full Charters

Two Conservancy chapters in the Southwest—Arizona and New Mexico—have been granted full charters by the Board of Governors. Chapter Chairmen Virgil Rule (Arizona) and Robert B. Anderson (New Mexico) were presented with the charters for their respective groups.

The Arizona Chapter is responsible for the management of three preserves: Patagonia, Canelo Hills Cienega, and Ramsey Canyon. Although there are at present no Conservancy preserves in New Mexico, the state chapter has organized a program for monitoring areas acquired and transferred by the Conservancy, such as Sevilleta Refuge—where a dam has been proposed by the Army Corps of Engineers.

In other chapter news: Michigan and North Carolina have received interim chapter status. After a year's time, these interim chapters will be considered for full charter status.

**NEXT IN THE NEWS:**

**PREDATORS**

The role of predation in natural systems will be our featured topic in the March/April issue of the *News*. Black-footed ferrets, gray bats, crocodiles, carnivorous plants—these are just a few who will make an appearance in the upcoming magazine. Keep an eye out.

**PHOTOS:** Susan Bournique, p. 8 top right; Curtis J. Carley, p. 24; Mike Champagne, p. 29; John Hall, p. 17; Clyde Lockwood, pp. 4, 7, 8 left, 9 bottom and top right, 10; Tim Loomis, p. 8 bottom right, 9 top left; National Fish and Wildlife Laboratory, p. 20 top; John Perkins, pp. 16, 20 bottom, 21; Tom Sennett, p. 27; S.C. Wildlife and Marine Resources Department, p. 19.

# Conservancy Chapters and Committees

*The following is a list of all Conservancy chapters and committees as well as their current mailing addresses and chairmen. The News will publish an update of this list from time to time.*

Arizona Chapter
P.O. Box 40326
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*John G. Sherwood, Chairman*

Southern California Chapter
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South Pasadena, CA 91030
*Diane Cooley, Chairman*

Tejon Sub-Chapter
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*Cynthia Nagel, Chairman*

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*A corporation becomes a Corporate Associate of The Nature Conservancy upon contributing between $1,000 and $10,000 annually to the operations of the organization.*

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